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(54) **REGION SETTING FOR INTIMA MEDIA THICKNESS MEASUREMENT IN AN ULTRASOUND SYSTEM**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,469,850 A 11/1995 Iizuka
6,835,177 B2 * 12/2004 Fritz et al. 600/443
(Continued)

FOREIGN PATENT DOCUMENTS

EP 0958784 A1 11/1999
EP 1728471 A1 12/2006
(Continued)

OTHER PUBLICATIONS

Inger Wendelhag,et al. "A new automated computerized analyzing system simplifies readings and reduces the variability in ultrasound measurement of intima-media thickness," Stroke, vol. 28, No. 11, Nov. 1997, pp. 2195-2200.
(Continued)

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(57) **ABSTRACT**

The present invention relates to an ultrasound system and a method of setting an intima-media thickness (IMT) measuring region. The ultrasound system comprises an ultrasound diagnosis unit configured to transmit ultrasound signals to a target object, receive ultrasound echo signals reflected from the target object and form an ultrasound image including a plurality of pixels based on the ultrasound echo signals, each pixel having an intensity of gray level. The ultrasound system further comprises a processor configured to compute intensities of the pixels at each row in the ultrasound image to form a first graph, compute first moving averages of the intensities for first subsets of rows in the ultrasound image by dividing the intensities by a thickness of a blood vessel to form a second graph, compute second moving averages of the intensities for second subsets of rows in the ultrasound image by dividing the intensities by a thickness of a vascular wall to form a third graph, and set an intima-media thickness (IMT) measuring region by using inflection points from the second and third graphs.

15 Claims, 5 Drawing Sheets